Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

NATIONAL GUIDELINE CLEARINGHOUSE

General

Guideline Title

American Academy of Orthopaedic Surgeons clinical practice guideline on the treatment of distal radius fractures.

Bibliographic Source(s)

American Academy of Orthopaedic Surgeons. American Academy of Orthopaedic Surgeons clinical practice guideline on the treatment of distal radius fractures. Rosemont (IL): American Academy of Orthopaedic Surgeons (AAOS); 2009 Dec 5. 208 p. [96 references]

Guideline Status

This is the current release of the guideline.

The American Academy of Orthopaedic Surgeons (AAOS) reaffirmed the currency of this guideline in 2011.

Recommendations

Major Recommendations

Definitions of the strength of recommendations (Strong, Moderate, Weak, Inconclusive, and Consensus) are provided at the end of the "Major Recommendations" field.

Note from the American Academy of Orthopaedic Surgeons (AAOS): This summary does not contain rationales that explain how and why these recommendations were developed nor does it contain the evidence supporting these recommendations. All readers of this summary are strongly urged to consult the full guideline and evidence report (see "Guideline Availability" and "Availability of Companion Documents" fields) for this information. The work group is confident that those who read the full guideline and evidence report will see that the recommendations were developed using systematic evidence-based processes designed to combat bias, enhance transparency, and promote reproducibility.

1. The work group is unable to recommend for or against performing nerve decompression when nerve dysfunction persists after reduction.
   Strength of Recommendation: Inconclusive

2. The work group is unable to recommend for or against casting as definitive treatment for unstable fractures that are initially adequately reduced.
   Strength of Recommendation: Inconclusive

3. The work group suggests operative fixation for fractures with post-reduction radial shortening >3 mm, dorsal tilt >10 degrees, or intra-articular displacement or step-off >2 mm as opposed to cast fixation.
   Strength of Recommendation: Moderate

4. The work group is unable to recommend for or against any one specific operative method for fixation of distal radius fractures.
   Strength of Recommendation: Inconclusive

5. The work group is unable to recommend for or against operative treatment for patients over age 55 with distal radius fractures.
   Strength of Recommendation: Inconclusive

6. The work group is unable to recommend for or against locking plates in patients over the age of 55 who are treated operatively.
   Strength of Recommendation: Inconclusive

7. The work group suggests rigid immobilization in preference to removable splints when using non-operative treatment for the management of displaced distal radius fractures.
   Strength of Recommendation: Moderate

8. The use of removable splints is an option when treating minimally displaced distal radius fractures.
   Strength of Recommendation: Weak

9. The work group is unable to recommend for or against immobilization of the elbow in patients treated with cast immobilization.
   Strength of Recommendation: Inconclusive

10. Arthroscopic evaluation of the articular surface is an option during operative treatment of intra-articular distal radius fractures.
    Strength of Recommendation: Weak

11. Operative treatment of associated ligament injuries (scapholunate interosseous ligament [SLIL] injuries, lunotriquetral [LT], or triangular fibrocartilage complex [TFCC] tears) at the time of radius fixation is an option.
    Strength of Recommendation: Weak

12. Arthroscopy is an option in patients with distal radius intra-articular fractures to improve diagnostic accuracy for wrist ligament injuries, and computerized tomography (CT) is an option to improve diagnostic accuracy for patterns of intra-articular fractures.
    Strength of Recommendation: Weak

13. The work group is unable to recommend for or against the use of supplemental bone grafts or substitutes when using locking plates.
    Strength of Recommendation: Inconclusive

14. The work group is unable to recommend for or against the use of bone graft (autograft or allograft) or bone graft substitutes for the filling of a bone void as an adjunct to other operative treatments.
    Strength of Recommendation: Inconclusive

15. In the absence of reliable evidence, it is the opinion of the work group that distal radius fractures that are treated non-operatively be followed by ongoing radiographic evaluation for 3 weeks and at cessation of immobilization.
    Strength of Recommendation: Consensus

16. The work group is unable to recommend whether two or three Kirschner wires should be used for distal radius fracture fixation.
    Strength of Recommendation: Inconclusive

17. The work group is unable to recommend for or against using the occurrence of distal radius fractures to predict future fragility fractures.
    Strength of Recommendation: Inconclusive

18. The work group is unable to recommend for or against concurrent surgical treatment of distal radioulnar joint instability in patients with operatively treated distal radius fractures.
    Strength of Recommendation: Inconclusive

19. The work group suggests that all patients with distal radius fractures receive a post-reduction true lateral x-ray of the carpus to assess distal radioulnar joint (DRUJ) alignment.
    Strength of Recommendation: Moderate

20. In the absence of reliable evidence, it is the opinion of the work group that all patients with distal radius fractures and unremitting pain during follow-up be reevaluated.
    Strength of Recommendation: Consensus

21. A home exercise program is an option for patients prescribed therapy after distal radius fracture.

Strength of Recommendation: Weak

22. In the absence of reliable evidence, it is the opinion of the work group that patients perform active finger motion exercises following diagnosis of distal radius fractures.
    Strength of Recommendation: Consensus

23. The work group suggests that patients do not need to begin early wrist motion routinely following stable fracture fixation.
    Strength of Recommendation: Moderate

24. In order to limit complications when using external fixation, it is an option to limit the duration of fixation.
    Strength of Recommendation: Weak

25. The work group is unable to recommend against over-distraction of the wrist when using an external fixator.
    Strength of Recommendation: Inconclusive

26. The work group suggests adjuvant treatment of distal radius fractures with Vitamin C for the prevention of disproportionate pain.
    Strength of Recommendation: Moderate

27. Ultrasound and/or ice are options for adjuvant treatment of distal radius fractures.
    Strength of Recommendation: Weak

28. The work group is unable to recommend for or against fixation of ulnar styloid fractures associated with distal radius fractures.
    Strength of Recommendation: Inconclusive

29. The work group is unable to recommend for or against using external fixation alone for the management of distal radius fractures where there is depressed lunate fossa or 4-part fracture (sagittal split).
    Strength of Recommendation: Inconclusive

Definitions:

Strength of Recommendation

Strength	Overall Quality of Evidence	Description of Evidence	Guideline Language
Strong	Good	Level I evidence from more than one study with consistent findings for recommending for or against the intervention or diagnostic.	The work group *recommends*
Moderate	Fair	Level II or III evidence from more than one study with consistent findings, or Level I evidence from a single study for recommending for or against the intervention or diagnostic.	The work group *suggests*
Weak	Poor	Level IV or V evidence from more than one study with consistent findings, or Level II or III evidence from a single study for recommending for against the intervention or diagnostic.	*option*
Inconclusive	None or conflicting	The evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention or diagnostic.	The work group is *unable to recommend for or against*
Consensus	No evidence	There is no supporting evidence. In the absence of reliable evidence, the work group is making a recommendation based on their clinical opinion considering the known harms and benefits associated with the treatment.	In the absence of reliable evidence, it is the *opinion* of the work group

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Distal radius fracture

Guideline Category

Evaluation

Management

Treatment

Clinical Specialty

Emergency Medicine

Family Practice

Internal Medicine

Orthopedic Surgery

Intended Users

Physicians

Guideline Objective(s)

- To help improve the treatment of distal radius fractures based on the current best evidence
- To guide qualified physicians through a series of treatment decisions in an effort to improve the quality and efficiency of care for distal radius fractures
- To serve as an information resource for professional healthcare practitioners and developers of practice guidelines and recommendations

Target Population

Adults (patients 19 years of age and older) with acute distal radius fracture

Interventions and Practices Considered

1. Rigid immobilization
2. Removable splints
3. Operative fixation as indicated
4. Arthroscopic evaluation of articular surface
5. Operative treatment of associated ligament injuries
6. Arthroscopy and computerized tomography
7. Ongoing radiographic evaluation of non-operatively treated fractures, as indicated
8. Kirschner wires (considered but unable to recommend 2 versus 3)
9. Post-reduction true lateral x-ray (for distal radioulnar joint [DRUJ] assessment)
10. Re-evaluation, if indicated

11. Home exercise, including active finger motion exercises
12. Necessity of early wrist motion with stable fracture fixation
13. Limiting duration of fixation
14. Vitamin C
15. Ultrasound and/or ice

Note: No recommendation for or against use could be made for the following interventions: nerve decompression when nerve dysfunction persists after reduction, casting as definitive treatment for unstable fractures that are initially adequately reduced, specific operative methods, operative treatment for patients over 55, locking plates in patients over 55, immobilization of the elbow in patients treated with cast immobilization, supplemental bone grafts or substitutes when using locking plates, bone graft (autograft or allograft) or bone graft substitutes for the filling of bone void, prediction of future fragility fractures, concurrent surgical treatment of distal radioulnar joint instability, fixation of ulnar styloid fractures, external fixation alone where there is depressed lunate fossa or 4-part fracture.

Major Outcomes Considered

- Pain relief
- Functional status
- Complications associated with operative treatments

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Study Selection Criteria

The work group developed *a priori* article inclusion criteria for their review. These criteria are their "rules of evidence" and articles that do not meet them are, for the purposes of this guideline, not evidence.

To be included in the systematic reviews (and hence, in this guideline) an article had to be a report of a study that:

- Evaluated a treatment for acute distal radius fracture; studies of nonunions, malunions, delayed unions, or osteotomies are excluded
- Was a full report of a clinical study and was published in the peer reviewed literature
- Was an English language article published after 1965
- Was not a cadaveric, animal, in vitro, or biomechanical study
- Was not a retrospective case series, medical records review, meeting abstract, unpublished study report, case report, historical article, editorial, letter, or commentary
- Was the most recent report of a study or the report with the largest number of enrolled patients in a study with multiple publications
- Enrolled ≥10 patients in each of its study groups
- For adverse events or complications, the studies must have groups with 25 or more patients
- Enrolled a patient population comprised of at least 80% of patients 19 years of age or older
- Reports quantified results

When examining primary studies, the work group analyzed the best available evidence regardless of study design. They first considered the randomized controlled trials (RCTs) identified by the search strategy. In the absence of two or more RCTs, they sequentially searched for prospective controlled trials, prospective comparative studies, retrospective comparative studies, and prospective case-series studies. Only studies of the highest level of available evidence were included, assuming that there were 2 or more studies of that higher level. For example, if there were

two Level II studies that addressed the recommendation, Level III and IV studies were not included.

See the original guideline document for more discussion on the outcomes considered and the effects of treatments in terms of the minimal clinically important improvement (MCII).

Literature Searches

The work group attempted to make the searches for articles comprehensive. Using comprehensive literature searches ensures that the evidence considered for this guideline is not biased for (or against) any particular point of view.

The work group searched for articles published from January 1966 to June 1, 2009. Strategies for searching electronic databases were constructed by a Medical Librarian using previously published search strategies to identify relevant RCTs. In the absence of relevant RCTs, the Medical Librarian modified the search strategy to identify studies of other designs. Four electronic databases were searched: PubMed, EMBASE, CINAHL, and The Cochrane Central Register of Controlled Trials.

Searches of electronic databases were supplemented with manual screening of the bibliographies of all retrieved publications. Bibliographies of recent systematic reviews and other review articles were also searched for potentially relevant citations. Finally, work group members provided a list of potentially relevant studies that were not identified by the searches. All articles identified were subject to the study selection criteria listed above.

The study attrition diagram in Appendix III of the original guideline document provides details about the inclusion and exclusion of the studies considered for this guideline. The search strategies used to identify these studies are provided in Appendix IV of the original guideline document.

2011 Reaffirmation

To reaffirm currency the PubMed, Cochrane Library, and EMBASE databases were searched using the following search terms: ((Radius fractures[mh] OR Radius/injuries[mh] OR Radius/surgery[mh] OR Radius/radiography[mh] OR ((fracture*[tiab] OR "fractures, bone"[mesh:noexp]) AND (radius[tw] OR radial[tiab]))) AND (distal[tw] OR (lower[tiab] AND end[tiab]) OR wrist[tw] OR radioulnar[tw] OR radiocarpal[tw])) OR (fracture*[tiab] AND (chauffeur*[tiab] OR radiocarpal[tw] OR radioulnar[tw])) OR "smith's fracture"[tiab] OR "colles' fracture"[tiab] OR "barton's fracture"[tiab]. The date range for all searches was 06/12/2009 to 06/29/2011 and the searches were performed on 06/29/2011.

Number of Source Documents

73 articles were included.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Levels of Evidence for Primary Research Question[1]

Types of Studies				
	Therapeutic Studies Investigating the results of treatment	Prognostic Studies Investigating the effects of a patient characteristic on the outcome of disease	Diagnostic Studies Investigating a diagnostic test	Economic and Decision Analyses Developing an economic or decision model
Level I	• High quality randomized trial with statistically significant difference or no statistically significant	• High quality prospective study[4] (all patients were enrolled at the same point in their disease with ≥80%	• Testing of previously developed diagnostic criteria on consecutive patients (with universally	• Sensible costs and alternatives; values obtained from many

Types of Studies	Therapeutic Studies Investigating the results of treatment	Prognostic Studies Investigating the effects of a patient characteristic on the outcome of disease	Diagnostic Studies Investigating a diagnostic test	Economic and Decision Analyses Developing an economic or decision model
	• Systematic review[2] of Level I randomized controlled trials (RCTs) (and study results were homogenous[3])	• Systematic review[2] of Level I studies	• Systematic review[2] of Level I studies	• Systematic review[2] of Level I studies
Level II	• Lesser quality RCT (e.g., <80% follow-up, no blinding, or improper randomization) • Prospective[4] comparative study[5] • Systematic review[2] of Level II studies or Level I studies with inconsistent results	• Retrospective study[6] • Untreated controls from an RCT • Lesser quality prospective study (e.g., patients enrolled at different points in their disease or <80% follow-up) • Systematic review[2] of Level II studies	• Development of diagnostic criteria on consecutive patients (with universally applied reference "gold" standard) • Systematic review[2] of Level II studies	• Sensible costs and alternatives; values obtained from limited studies; with multiway sensitivity analyses • Systematic review[2] of Level II studies
Level III	• Case control study[7] • Retrospective[6] comparative study[5] • Systematic review[2] of Level III studies	• Case control study[7]	• Study of nonconsecutive patients; without consistently applied reference "gold" standard • Systematic review[2] of Level III studies	• Analyses based on limited alternatives and costs; and poor estimates • Systematic review[2] of Level III studies
Level IV	• Case series[8]	• Case series	• Case-control study • Poor reference standard	• Analyses with no sensitivity analyses
Level V	Expert opinion	Expert opinion	Expert opinion	Expert opinion

[1] A complete assessment of quality of individual studies requires critical appraisal of all aspects of the study design.

[2] A combination of results from two or more prior studies.

[3] Studies provided consistent results.

[4] Study was started before the first patient enrolled.

[5] Patients treated one way (e.g., cemented hip arthroplasty) compared with a group of patients treated in another way (e.g., uncemented hip arthroplasty) at the same institution.

[6] The study was started after the first patient enrolled.

[7] Patients identified for the study based on their outcome, called "cases"; e.g., failed total hip arthroplasty, are compared to those who did not have outcome, called "controls"; e.g., successful total hip arthroplasty.

[8] Patients treated one way with no comparison group of patients treated in another way.

Methods Used to Analyze the Evidence

Meta-Analysis of Randomized Controlled Trials

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Data Extraction

Data elements extracted from studies were defined in consultation with the physician work group. A research analyst completed data extraction independently for all studies. The elements extracted are shown in Appendix V in the original guideline document. Evidence tables were constructed to summarize the best evidence pertaining to each preliminary recommendation. Disagreements about the accuracy of extracted data were resolved by consensus and consulting the work group. Disagreements were resolved by consensus and by consulting the physician work group.

Evidence tables are available as a supplemental document available on the American Academy of Orthopaedic Surgeons (AAOS) website http://www.aaos.org/research/guidelines/guide.asp. These evidence tables include complete lists of included and excluded articles, quality and design parameters of the included studies, and raw data extracted from the included studies.

Judging the Quality of the Evidence

Assigning a level of evidence on the basis of study design plus other quality characteristics ties the levels of evidence that is reported more closely to quality than levels of evidence based only on study design. Because the work group ties quality to levels of evidence, they are able to characterize the confidence one can have in their results. Accordingly, the work group characterizes the confidence one can have in Level I evidence as high, the confidence one can have in Level II and III evidence as moderate, and the confidence one can have in Level IV and V evidence as low.

Treatment Studies

In studies investigating the result of treatment, the work group assessed the quality of the evidence for each outcome at each time point reported in a study. They did not simply assess the overall quality of a study. This approach follows the recommendations of the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) working group as well as others.

The work group evaluated quality on a per outcome basis rather than a per study basis because quality is not necessarily the same for all outcomes and all follow-up times reported in a study. For example, a study might report results immediately after patients received a given treatment and after some period of time has passed. Often, nearly all enrolled patients contribute data at early follow-up times but, at much later follow-up times, only a few patients may contribute data. One has more confidence in the earlier data than in the later data. The fact that the work group would assign a higher quality score to the earlier results reflects this difference in confidence.

The work group assessed the quality of treatment studies using a two step process. First, they assigned a level of evidence to all results reported in a study based solely on that study's design. Accordingly, all data presented in randomized controlled trials were initially categorized as Level I evidence, all results presented in non-randomized controlled trials and other prospective comparative studies were initially categorized as Level II. The work group next assessed each outcome at each reported time point using a quality questionnaire and, when quality standards were not met, downgraded the level of evidence (for this outcome at this time point) by one level (see Appendix VI in the original guideline document).

Diagnostic Studies

In studies investigating a diagnostic test, the work group used the Quality Assessment of Diagnostic Accuracy Studies (QUADAS) instrument to identify potential bias and assess variability and the quality of reporting in studies reporting the effectiveness of diagnostic techniques. The work group utilized a two step process to assess the quality of diagnostic studies. All studies enrolling a prospective cohort of patients are initially categorized as Level I studies. Any study that did not enroll the appropriate spectrum of patients (e.g., case-control studies) was initially categorized as a Level IV study. A study that was determined to contain methodological flaws (i.e., QUADAS question answered 'no') that introduce bias was downgraded in a cumulative manner for each known bias (see Appendix VI in the original guideline document). For example, a study that is determined by the QUADAS instrument to have two biases is downgraded to Level III and a study that is determined to have four or more biases is downgraded to a Level V study. Those studies that do not sufficiently report their methods for a potential bias are downgraded to Level II since the work group is unable to determine if the bias did or did not bias the results of the study.

Prognostic Studies

In studies investigating the effect of a characteristic on the outcome of disease, the work group assessed quality using a two-step process. Any study that investigated a prospectively enrolled cohort of patients and utilized regression analysis was initially categorized as a Level I study. A study that used regression analysis in a retrospectively enrolled cohort of patients was categorized as a Level II study. The work group next assessed the outcome (dependent variable) for each prognostic factor (independent variable) using a quality questionnaire and, when quality standards were not met, the level of evidence was downgraded by one level (see Appendix VI in the original guideline document).

Statistical Methods

When possible the results of statistical analysis conducted by the AAOS Clinical Practice Guidelines Unit using STATA 10.0 (StataCorp LP, College Station, Texas) are reported. The program was used to determine the magnitude of the treatment effect. For data reported as means (and associated measures of dispersion) the standardized mean difference was calculated by the method of Hedges and Olkin. For proportions, the odds ratio was calculated as a measure of treatment effect. When no events occur ("zero event") in a proportion, the variance of the arcsine difference was used to determine statistical significance ($p < 0.05$).

When published studies report measures of dispersion other than the standard deviation the value was estimated to facilitate calculation of the treatment effect. In studies that report standard errors or confidence intervals the standard deviation was back-calculated. In studies that only report the median, range, and size of the trial, the work group estimated the means and variances according to a published method. Studies that report results in graphical form were analyzed with TechDig 2.0 (Ronald B. Jones, Mundelein, Illinois) to estimate the mean and variance.

In some circumstances statistical testing was conducted by the authors and measures of dispersion were not reported. In the absence of measures of dispersion, the results of the statistical analyses conducted by the authors are included in the analysis and are identified as those of the study authors.

To determine if a study was sufficiently powered to detect the minimal clinically important improvement (MCII), G*Power 3 (Franz Faul, Universitat Kiel, Germany) was used. For these calculations, 80% power, 95% confidence intervals, and the number of patients per group were used. This permits calculation of the minimal detectable effect size which was compared to the MCII effect size, reported above, to determine if the study was sufficiently powered to detect the MCII.

Likelihood ratios, sensitivity, specificity and 95% confidence intervals were used to determine the accuracy of diagnostic modalities based on two by two diagnostic contingency tables extracted from the included studies. When possible, prognostic factors were analyzed according to sensitivity and specificity as well. Likelihood ratios are interpreted according to previously published values. Likelihood ratios, sensitivity, specificity and 95% confidence intervals were calculated in STATA 10.0 using the "midas" command. For diagnostic meta-analysis the hierarchical summary receiver operating characteristic (HSROC) curve was used. This was implemented using the "metandi" command in STATA. Prediction regions are reported to assess heterogeneity.

Methods Used to Formulate the Recommendations

Expert Consensus (Nominal Group Technique)

Description of Methods Used to Formulate the Recommendations

This guideline and systematic review were prepared by the American Academy of Orthopaedic Surgeons (AAOS) Treatment of Acute Distal Radius Fractures guideline work group with the assistance of the AAOS Clinical Practice Guidelines Unit in the Department of Research and Scientific Affairs at the AAOS.

To develop this guideline, the work group held an introductory meeting to develop the scope of the guideline on July 17 and 18, 2008. Upon completion of the systematic review, the work group met again on July 18 and 19, 2009 to write and vote on the final recommendations and rationales for each recommendation.

Formulating Preliminary Recommendations

The work group began work on this guideline by constructing a set of preliminary recommendations. These recommendations specify [what] will be done in [whom], [when], [where], and [how often or how long]. They function as questions for the systematic review, not as final recommendations or conclusions. Preliminary recommendations are almost always modified on the basis of the results of the systematic review. Once established, these *a priori* preliminary recommendations cannot be modified until the final work group meeting, they must be addressed by the systematic review, and the relevant review results must be presented in the final guideline.

Consensus Development

The recommendations and their strength were voted on using a structured voting technique known as the nominal group technique. Voting on guideline recommendations was conducted using a secret ballot and work group members were blinded to the responses of other members. If disagreement between work group members was significant, there was further discussion to see whether the disagreement(s) could be resolved. Up to three rounds of voting were held to attempt to resolve disagreements. If disagreements were not resolved following three voting rounds, no recommendation was adopted. Lack of agreement is a reason that the strength for some recommendations is labeled "Inconclusive."

See Appendix VIII in the original guideline document for further details of the nominal group technique as well as a discussion of opinion based recommendations.

Defining the Strength of the Recommendations

To develop the strength of a recommendation, AAOS staff first assigned a preliminary strength for each recommendation that took only the quality and quantity of the available evidence into account (see "Rating Scheme for the Strength of the Recommendations" field). Work group members then modified the preliminary strength using the 'Form for Assigning Strength of Recommendation (Interventions)' shown in Appendix VII of the original guideline document.

2011 Reaffirmation

After review of the updated 2009-2011 literature, the AAOS determined that no changes were required.

Rating Scheme for the Strength of the Recommendations

Strength of Recommendation

Strength	Overall Quality of Evidence	Description of Evidence	Guideline Language
Strong	Good	Level I evidence from more than one study with consistent findings for recommending for or against the intervention or diagnostic.	The work group *recommends*
Moderate	Fair	Level II or III evidence from more than one study with consistent findings, or Level I evidence from a single study for recommending for or against the intervention or diagnostic.	The work group *suggests*
Weak	Poor	Level IV or V evidence from more than one study with consistent findings, or Level II or III evidence from a single study for recommending for against the intervention or diagnostic.	*option*
Inconclusive	None or conflicting	The evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention or diagnostic.	The work group is *unable to recommend for or against*
Consensus	No evidence	There is no supporting evidence. In the absence of reliable evidence, the work group is making a recommendation based on their clinical opinion considering the known harms and benefits associated with the treatment.	In the absence of reliable evidence, it is the *opinion* of the work group

Cost Analysis

The guideline developers reviewed published cost analyses.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

Peer Review

The draft of the guideline and evidence report was peer reviewed by an expert, outside advisory panel that was nominated by the physician work group prior to the development of the guideline. Peer review was accomplished using a structured peer review form (see Appendix IX in the original guideline document).

In addition, the physician members of the American Academy of Orthopaedic Surgeons (AAOS) Guidelines and Technology Oversight Committee, the Evidence Based Practice Committee and the Chairpersons of the AAOS Occupational Health and Workers' Compensation Committee and the Medical Liability Committee were given the opportunity to provide peer review of the draft document.

The work group forwarded the draft guideline to a total of 28 peer reviewers and 13 returned reviews. The disposition of all non-editorial peer review comments was documented and the guideline was modified in response to peer review. The peer reviews and the responses to them accompanied this guideline through the process of public commentary and the subsequent approval process. Peer reviewing organizations and peer reviewing individuals are listed in the original guideline document if they explicitly agree to allow us to publish this information (see Appendix X in the original guideline document).

Public Commentary

After modifying the draft in response to peer review, the guideline was subjected to a thirty day period of "Public Commentary." Commentators consist of members of the AAOS Board of Directors (BOD), members of the Council on Research, Quality Assessment, and Technology (CORQAT), members of the Board of Councilors (BOC)*, and members of the Board of Specialty Societies (BOS)*. Based on these bodies, up to 185 commentators* had the opportunity to provide input into this guideline development process. Of these, 4 returned public comments (see Appendix X in the original guideline document).

The AAOS Guideline Approval Process

Following public commentary, the draft was again modified by the AAOS Clinical Practice Guidelines Unit and work group members. This final guideline draft was approved by the AAOS Guidelines Oversight Committee, the AAOS Evidence Based Practice Committee, the AAOS Council on Research, Quality Assessment, and Technology, and the AAOS Board of Directors. Descriptions of these bodies are provided in Appendix II in the original guideline document.

*For this guideline, outside specialty societies could post the confidential draft of the guideline to their "member only" website. The responses garnered from this posting were compiled by the specialty society and submitted as one succinct public comment. In addition, members of the Board of Specialties (BOS) and Board of Councilors (BOC) were encouraged to provide input; including encouragement to seek input from colleagues not necessarily members of the BOS or BOC. As a result, the actual number of members who were given the opportunity to comment on this guideline exceeds the number of public commentators for previous guidelines.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is specifically stated for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Appropriate treatment of patients with a distal radius fracture to enable pain relief and maintenance of the patient's functional status

Potential Harms

Most treatments are associated with some known risks, especially invasive and operative treatments. Therefore, discussion of available treatments and procedures applicable to the individual patient rely on mutual communication between the patient and physician, weighing the potential risks and benefits for that patient.

Some of the more common risks associated with operative treatments are:

- Carpal tunnel syndrome
- Ulnar, median, and radial nerve symptoms
- Malunion
- Tendon rupture
- Infection
- Loss of reduction
- Reflex sympathetic dystrophy
- Finger stiffness

Contraindications

Contraindications

Contraindications vary widely based on the treatment administered. Therefore, discussion of available treatments and procedures applicable to the individual patient rely on mutual communication between the patient and physician, weighing the potential risks and benefits for that patient.

Qualifying Statements

Qualifying Statements

- This Clinical Practice Guideline was developed by an American Academy of Orthopaedic Surgeons (AAOS) physician volunteer Work Group based on a systematic review of the current scientific and clinical information and accepted approaches to treatment and/or diagnosis. This Clinical Practice Guideline is not intended to be a fixed protocol, as some patients may require more or less treatment or different means of diagnosis. Clinical patients may not necessarily be the same as those found in a clinical trial. Patient care and treatment should always be based on a clinician's independent medical judgment, given the individual patient's clinical circumstances.
- Some drugs or medical devices referenced or described in this Clinical Practice Guideline may not have been cleared by the U.S. Food and Drug Administration (FDA) or may have been cleared for a specific use only. The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or device he or she wishes to use in clinical practice.
- This summary of recommendations is not intended to stand alone. Treatment decisions should be made in light of all circumstances presented by the patient. Treatments and procedures applicable to the individual patient rely on mutual communication between patient, physician, and other healthcare practitioners.
- This guideline is not to be construed as including all proper methods of care or excluding methods of care reasonably directed to obtaining the same results. The ultimate judgment regarding any specific procedure or treatment includes consideration of all circumstances presented by the patient and the needs and resources particular to the locality or institution.

Implementation of the Guideline

Description of Implementation Strategy

Guideline Dissemination Plans

This document is also posted on the American Academy of Orthopaedic Surgeons (AAOS) website at

http://www.aaos.org/research/guidelines/guide.asp.

Shorter versions of the guideline are available in other venues. Publication of most guidelines is announced by an Academy press release, articles authored by the work group and published in the Journal of the American Academy of Orthopaedic Surgeons, and articles published in AAOS *Now*. Most guidelines are also distributed at the AAOS Annual Meeting in various venues such as on Academy Row and at Committee Scientific Exhibits.

Selected guidelines are disseminated by webinar, an Online Module for the Orthopaedic Knowledge Online website, Radio Media Tours, Media Briefings, and by distributing them at relevant Continuing Medical Education (CME) courses and at the AAOS Resource Center.

Other dissemination efforts outside of the AAOS will include submitting the guideline to the National Guideline Clearinghouse and distributing the guideline at other medical specialty societies' meetings.

Implementation Tools

Foreign Language Translations

Patient Resources

Quick Reference Guides/Physician Guides

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

IOM Domain

Effectiveness

Identifying Information and Availability

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Guideline Developer(s)

American Academy of Orthopaedic Surgeons - Medical Specialty Society

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Guideline Committee

This guideline and systematic review were prepared by the American Academy of Orthopaedic Surgeons (AAOS) Treatment of Acute Distal Radius Fractures guideline work group, with the assistance of the AAOS Clinical Practice Guidelines Unit in the Department of Research and Scientific Affairs at the AAOS.

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Financial Disclosures/Conflicts of Interest

All members of the American Academy of Orthopaedic Surgeons (AAOS) work group disclosed any conflicts of interest prior to the development of the recommendations for this guideline. Conflicts of interest are disclosed in writing with the American Academy of Orthopaedic Surgeons via a private on-line reporting database and also verbally at the recommendation approval meeting.

Disclosure Items: (n) = Respondent answered 'No' to all items indicating no conflicts. 1 = Board member/owner/officer/committee appointments; 2 = Medical/orthopaedic publications; 3 = Royalties; 4 = Speakers bureau/paid presentations; 5A = Paid consultant; 5B = Unpaid consultant; 6 = Research or institutional support from a publisher; 7 = Research or institutional support from a company or supplier; 8 = Stock or stock options; 9 = Other financial/material support from a publisher; 10 = Other financial/material support from a company or supplier.

David M Lichtman, MD: 1 (Society of Medical Consultants to the Armed Forces). Submitted on: 10/20/2008 at 11:22 AM.

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Michael J Goldberg, MD: 2 (Journal of Pediatric Orthopedics; Journal of Children's Orthopaedics [Europe]). Submitted on: 03/18/2009 at 01:28 PM and last confirmed as accurate on 10/19/2009.

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William Charles Watters III, MD: 1 (North American Spine Society; American Board of Spine Surgery; Board of Advisor Official Disability Guidelines; Associate Member of The Editorial Board, The Spine Journal; Med Center Ambulatory Surgery Center); 2 (The Spine Journal); 4 (Stryker; Synthes); 5A (Orthofix, Inc.; Stryker); 8 (Intrinsic Therapeutics). Submitted on: 08/14/2009.

Guideline Status

This is the current release of the guideline.

The American Academy of Orthopaedic Surgeons (AAOS) reaffirmed the currency of this guideline in 2011.

Guideline Availability

Electronic copies: Available from American Academy of Orthopaedic Surgeons Web site .

Print copies: Available from the American Academy of Orthopaedic Surgeons, 6300 North River Road, Rosemont, IL 60018-4262. Telephone: (800) 626-6726 (800 346-AAOS); Fax: (847) 823-8125; Web site: www.aaos.org .

Availability of Companion Documents

The following are available:

- The treatment of distal radius fractures. Summary of recommendations. Rosemont (IL): American Academy of Orthopaedic Surgeons; 2009 Dec. 4 p. Electronic copies: Available from the American Academy of Orthopaedic Surgeons (AAOS) Web site .
- The treatment of distal radius fractures. Evidence tables. Rosemont (IL): American Academy of Orthopaedic Surgeons; 2009. 138 p. Electronic copies: Available from the AAOS Web site .

Print copies: Available from the American Academy of Orthopaedic Surgeons, 6300 North River Road, Rosemont, IL 60018-4262. Telephone: (800) 626-6726 (800 346-AAOS); Fax: (847) 823-8125; Web site: www.aaos.org .

Patient Resources

The following are available:

- Distal radius fracture (Colles fracture): broken bones and injury. 2007 Aug. Electronic copies: Available in English and Spanish from the American Academy of Orthopaedic Surgeons (AAOS) Web site.
- Helping fractures heal: treatment and rehabilitation. 2010 Jan. Electronic copies: Available from the AAOS Web site.

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC Status

This NGC summary was completed by ECRI Institute on August 25, 2010. The currency of the guideline was reaffirmed by the developer in 2011 and this summary was updated by ECRI Institute on March 2, 2015.

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